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MUTUAL ADAPTATION OF THE SEXES IN *ARGIA* *MOESTA PUTRIDA*.

BY E. M. WALKER, TORONTO.

On August 1st, 1912, I captured a pair of *Argia moesta putrida* at Go Home Bay, Ont., and by killing them suddenly with gasoline, prevented the separation of the abdominal appendages of the male from the parts of the female with which they were in contact. I noted carefully the relations of the structures forming the connection, but unfortunately made no drawings at the time, as the specimens remained in their natural position after drying and the connection was apparently permanent. In carrying the specimens to Toronto, however, they separated, so that I have had to rely upon my original observations and a close scrutiny of the structures concerned in my further study of the method by which coupling in this species is effected. Some difficulties as to the precise position of the inferior appendages of the male in relation to the pronotum of the female were readily solved by making plasticine models of the parts of both sexes and fitting them together.

The only published account of the process of coupling in the genus *Argia* is given by E. B. Williamson in an article entitled "Copulation in Odonata."* In this paper a classification of the methods of coupling in a number of zygopterous genera is given, and the following extract gives all that is known in regard to this process in the genus *Argia*, the observations having been made upon two species—*A. moesta putrida* and *A. apicalis*.

"BB. Inferior appendages forming two jaws which grasp the anterior surface of the hind lobe of the pronotum of the female, the superior appendages resting in cups formed by depressions in the mesostigmal laminae and the rear surface of the hind lobe of the pronotum and, depending on their

*Ent. News, XIII., pp. 143-148, 1906.

form, grasping the mesostigmal laminal or rot. The female, by drawing the hind lobe of the pronotum closely against the mesostigmal laminal, prevents the escape of the male.

D. Dorsum of apex of segment 10 of male modified to form a brace against the middorsal carina or its fork or the cavity in the fork. *Anomalagrion*, *Ischnura*, *Enallagma*.

DD. Dorsum of apex of segment 10 of male with a viscid pruinose tubercle on either side which attaches itself to the mesoepisternum of the female on either side of the fork of the middorsal carina, the tubercle which corresponds to the inferior appendage of Anisoptera engaging the cavity in the fork between the mesostigmal laminae. *Argia* (*putrida* and *apicalis*)."

In my specimens the inferior appendages of the male were in contact with the dorsum of the pronotum of the female in the position shown in fig. 1. The posterior prominence of the inferior appendages fits into the depression between the middle and hind lobes of the pronotum, which is deepened on each side to receive it (figs. 3 and 4). Thus the posterior surface of the inferior appendages (p. i. ap.) is applied to the anterior surface of the hind lobe of the pronotum of the female and the postero-ventral surface of the appendages (v. i. ap.) rests upon the postero-dorsal surface of the middle lobe of the pronotum. The upper and outer angle of each inferior appendage bears a small slightly hooked process (n), which clasps the posterior margin of the hind lobe of the pronotum. The superior appendages do not "rest in caps formed by depressions in the mesostigmal laminae, etc." but the reverse is the case. The "ear" of each mesostigmal lamina is received into the concavity of the corresponding male superior appendage (figs. 1 and 4), which apparently rests in the pit on the mesoepisternum just beneath the former. The mesoepisternal tubercles of the female, which are but slightly developed in this species, do not seem to play an important part in this process, except perhaps in forming the outer boundary of the pit just referred to. I have not actually

verified the statements made by Williamson in Section DD of his analysis, but, in fitting my model together, I found that the parts mentioned by him here must necessarily be related in exactly the manner described.

As stated by Williamson in Section BB, "The female, by drawing the hind lobe of the pronotum against the mesostigmal laminae, prevents the escape of the male." In the case of *Argia moesta putrida*, the result of this action is that the two pairs of appendages of the male are drawn together and it can readily be seen by examining the figures that in such a position these appendages are incapable of being shifted in any direction, and hence escape of the male is impossible unless permitted by the female.

The mutual adaptation of these structures in the two sexes is so precise that it seems improbable that copulation could take place between different species of *Argia*, even though very closely related.

EXPLANATION OF PLATE VIII.

Fig. 1.—Position of the abdominal appendages of the male in relation to the thorax of the female in copulation.

Fig. 2.—Posterior view of end of male abdomen.

Fig. 3.—Dorsal view of parts of the pronotum and mesoepisternum of the female.

Fig. 4.—Semi-diagrammatic combination of figures 2 and 3, showing the relative positions of the parts in coupling. The parts of the male are indicated by dotted lines.

S. ap., superior appendage of male; i. ap., inferior appendage of male; p. i. ap., posterior surface of same; v. i. ap., postero-ventral surface of same; h. terminal hook of same; m. t., tubercle which engages the cavity between the forks of the dorsal thoracic carina; v. t., viscid lateral tubercle; m. p., middle lobe of pronotum of female; h. p., hind lobe of pronotum of female; d. c., middorsal thoracic carina; ms. l., mesostigmal lamina of female; ms. t., mesoepisternal tubercle of female.

A NEW SPECIES OF NEUROTERUS FROM WASHINGTON.

BY WILLIAM BEUTENMULLER, NEW YORK.

Neuroterus washingtonensis, sp. nov.

Male.—Head black, mouth parts pitchy brown; front shining and indistinctly rugose; eyes very large and conspicuously reticulated. Antennæ 14-jointed, basal joints pale yellowish brown, terminal joints darker. Thorax dark brown, with the whole surface finely crackled and with minute whitish hairs; parapsidal grooves very fine and line-like and extending to beyond the middle; median line also fine and almost reaching the scutellum. All the lines may be seen by transmitted light; sides of thorax yellowish brown. Scutellum blackish brown, large, rounded and obtusely pointed at the apex; it is more distinctly crackled than the thorax, with a fine transverse line at base, and covered with a few scattered whitish hairs. Abdomen small, smooth and shining; petiole long and yellowish brown. Legs pale yellowish brown. Wings hyaline; veins brown, radial area closed; cubitus not extending to the first cross-vein; arcolet large and triangular; anal vein broken. Length, 1.75 to 2 mm.

Female.—Wholly black, abdomen robust and large, petiole very short. Antennæ darker and shorter than the male, 13-jointed. Legs shorter and stouter than those of the male, yellowish-brown, with all the femora dark brown to nearly the tip. Ovipositor very long.

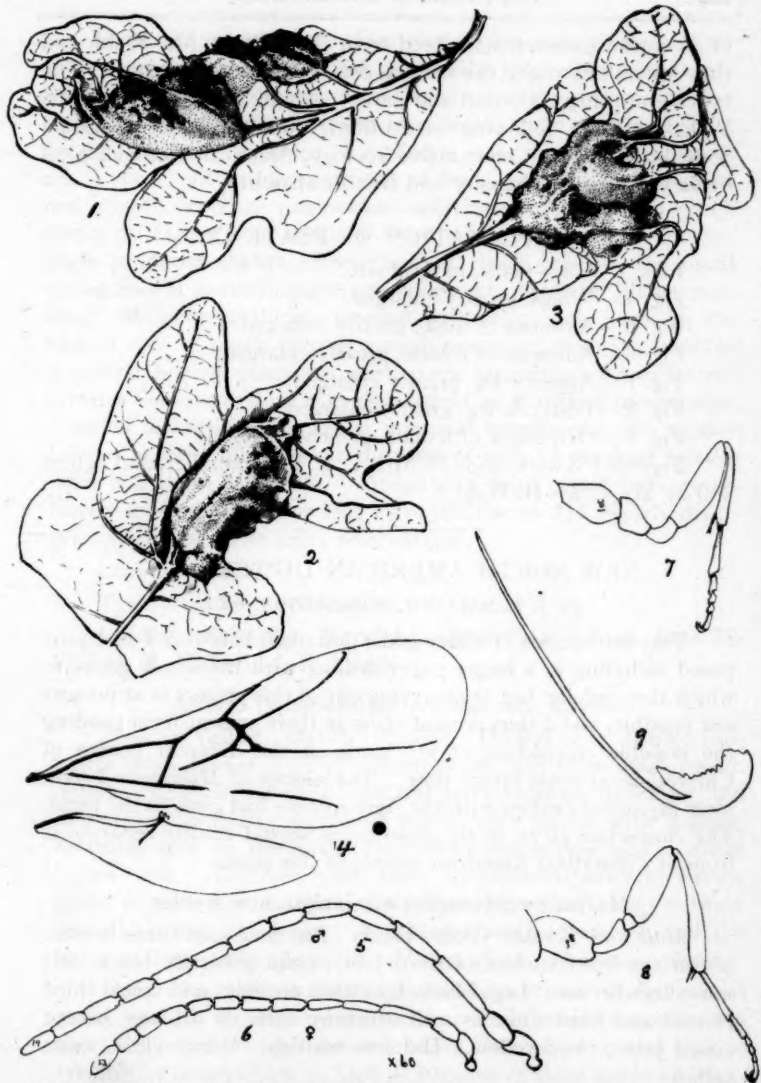
Length: 1.50–2 mm.

Gall: On the leaves of white oak (*Quercus garryana*), singly or in numbers on the mid-rib and principal veins, sometimes deforming the entire leaf. Rounded, irregularly rounded, oval or elongate and often forming a shapeless mass when confluent. Green and fleshy when fresh; brown, hard and woody when old and dry. Inside it is solid, whitish and filled with numerous larval cells.

Length, 10–35 mm. Width, 10–15 mm.

Habitat: Friday Harbor, Puget Sound, Washington. Galls, July 2nd, 1911. Flies, July 30th, 1911. Lewis H. Weld, collector.

The species is allied to *Neuroterus batatus* and *N. noxiosus*, and it is probably double brooded like these two species. The gall somewhat resembles that of *N. noxiosus*. Hundreds of specimens



NEUROTERUS WASHINGTONENSIS (BEUTENMÜLLER).

of *N. washingtonensis* were bred from the galls by Mr. Weld, and they are all essentially the same as color, form and sculpture. The types are in my collection and paratypes were deposited with Mr. Weld, and the following institutions: United States National Museum, Museum Comparative Zoology, American Entomological Society, Cornell University and British Museum.

EXPLANATION OF PLATE IX.

Figs. 1, 2, 3.—Galls, natural size.

Fig. 4.—Wings, greatly enlarged.

Fig. 5.—Antennæ of male, greatly enlarged.

Fig. 6.—Antennæ of female, greatly enlarged.

Fig. 7.—Anterior leg, greatly enlarged.

Fig. 8.—Posterior leg, greatly enlarged.

Fig. 9.—Ovipositor of female, greatly enlarged.

Figures 1-3 were made by Mrs. E. L. Beutenmuller, and figures 4-9 by Mr. Lewis H. Weld.

NEW NORTH AMERICAN DIPTERA.

BY J. R. MALLOCH, WASHINGTON, D.C.

The two species of Chloropidæ described herewith I had purposed including in a larger paper dealing with the whole genus to which they belong, but the carrying out of this project is at present not possible, and I thus present them in their present form pending the possible completion of my work on the different genera of Chloropidæ at some future time. The species of *Milichiella* I took after my paper dealing with the Agromyzidæ had gone to the press. The characters given in the description should readily separate it from any described American species of this genus.

Madiza (= *Siphonella*) *nigripalpis*, new species.

Male and Female: Glossy black. Antennæ sometimes brownish on the inner surface of third joint; palpi generally black, but sometimes brown. Legs black; fore tibiæ entirely, and apical third of mid and hind tibiæ as well as entire tarsi on all legs, except apical joint, clear yellow. Halteres whitish. Wings clear, veins yellow.

September, 1913

Frons about one-third wider than either eye, whole surface glossy; triangle poorly defined, occupying more than two-thirds the width of vertex and reaching slightly over midway to anterior margin of frons; surface hairs on frons weak, those on triangle confined to margins; antennæ of moderate size, third joint rounded; arista short, not as long as width of frons, basal joints elongated and slightly swollen, pubescence indistinct; face concave; cheek distinctly higher than width of third antennal joint, the anterior angle produced slightly; lower half of cheek bristled, the usual strong hair at anterior angle; eye pubescent, distinctly higher than long. Mesonotum thickly covered with short, pale hairs, at the base of each of which there is a small puncture; there are traces of a central line of punctures, and, more distinctly, of two lateral, broader lines; scutellum with disk haired as of disk of mesonotum, rounded in outline; two apical marginal bristles and two weaker bristles anterior to them, at the base of each of the long bristles there is a slight tubercle. Wings with third costal division distinctly more than half as long as second; veins 3-4 slightly divergent at apices; outer cross vein oblique.

Length, 1.5 mm.

Type in author's collection.

Locality: Beltsville, Maryland, swept in hay field, June 15, 1913 (J. R. Malloch, J. D. Hood).

Madiza (= *Siphonella*) *projecta*, new species.

Female: Yellow, slightly shining. Ocellar spot black; proboscis glossy brown at joint. Mesonotum with three black-brown stripes, which are not clearly defined and sometimes indistinct, the side stripes generally shortened posteriorly; pleuræ with a dark, brownish spot on the middle; scutellum sometimes with a discal brown spot. Abdomen with three longitudinal rows of brown spots, or with fore margins of segments brownish. Legs entirely yellow, or with the femora slightly darkened at middle, and the bases of hind tibiæ darkened. Wings clear. Halteres yellow.

Head in profile distinctly produced at mouth margin; frons about one-half the head width, surface hairs pale; proboscis very long, either half as high as head; arista bare, short, not as long as breadth of frons; cheek as high as breadth of third antennal joint;

eyes pubescent. Mesonotum with a more or less distinct central line of punctures and the disk covered with short pale hairs; scutellum rounded, four distinct marginal bristles present, the disk with short hairs. Legs normal. Wings with third costal division two-thirds as long as second; veins 3-4 subparallel; outer cross vein slightly oblique; last section of fifth vein nearly twice as long as penultimate section of fourth.

Length, 1.5 mm.

Type: Cat. No. 16002, U.S.N.M.

Locality: Las Cruces, New Mexico, May 20, 1896, on *Yucca angustifolia* (T. D. A. Cockerell).

Paratypes: Same data, and one specimen, Mesilla Park, May 7 (T. D. A. Cockerell). Five specimens.

Milichiella urbana, new species.

Female: Black-brown, slightly shining. Mesonotum opaque brown. Abdomen slightly shining and almost black in color. Legs with tarsi brownish, the remainder black. Wings clear, veins brown. Halteres brown.

Frons at least one-half the head width, opaque, orbits very narrow, grayish pollinose, bristles distinct, and extending to the base of antennae; center rows slightly divergent towards ocelli; antennae of normal size; arista slightly pubescent, hairlike, a little longer than length of frons; three bristles above level of mouth; cheek linear, marginal bristles distinct; palpi and proboscis normal; incision on posterior eye margin distinct. Mesonotum with disk covered with short black setulae and with one pair of prescutellar dorso-centrals; scutellar bristles subequal. Abdominal segments with short discal hairs, apex of last segment setulose. Legs without bristles, their surfaces with short hairs. Wings with veins 2-3 slightly divergent at apices, veins 3-4 slightly convergent at apices; last section of fifth vein slightly longer than penultimate section of fourth.

Length, 1.25 mm.

Type in author's collection.

Locality: Washington, District of Columbia, June 23, 1913, at an open window in center of city (J. R. Malloch).

REPORT ON A COLLECTION OF JAPANESE CRANE-
FLIES (TIPULIDÆ), WITH A KEY TO THE SPECIES
OF PTYCHOPTERA.

BY CHARLES P. ALEXANDER, ITHACA, N.Y.

(Continued from Page 210.)

Gonomyia (Gonomyia) superba, sp. n.

Antennæ, brown; color, brown and yellow; vein, *Sc* ends slightly beyond the origin of *Rs*.

Male.—Length, 5–5.5 mm.; wing, 4.9 mm.

Female.—Length, 5.9 mm; wing, 5.2–5.5 mm.

Male.—Rostrum yellow, palpi brown; antennæ brown, including the basal segments; front, vertex and occiput dull yellow, the vertex clearer yellow behind.

Pronotum, clear light yellow above; on the sides, a short, dull brown stripe from the cervical sclerites down to above the fore coxa. Mesonotum, præscutum very light yellowish brown, with rich chestnut-brown stripes, a median stripe, broad and dark in front, narrow behind, and again enlarged at its end divided by a pale, narrow, median stripe; lateral stripes short, beginning behind the pseudosutural pits crossing the transverse suture and suffusing the lobes of the scutum; lateral edge of the præscutum, in front, yellowish; behind, brown; scutellum pale, whitish; the base and lateral edges tinged with brownish, post notum brown. Pleuræ clear yellowish white, an irregular dark brown mark behind and above the base of the coxa; sternum yellow, the sides of the mesosternum, between the fore and middle legs, brown, separated by a broad median pale mark; the propleural stripe begins on the prosternum as a rounded mark which sends out a narrow caudal prolongation. Halteres light yellow. Legs: coxæ and trochanters light yellow, margins of the segments more or less brown; femora and tibiæ light brown; tarsi somewhat darker brown. Wings, hyaline or nearly so; veins brown, costa more yellowish. Venation (see fig. 14, pl. III): *Sc* ending slightly beyond the origin of *Rs*; basal deflection of *Cu*¹ about at the fork of *M*.

Abdomen, tergum, light yellow, each segment with a large brown mark on basal half, the caudal margin of this mark much

rounded; sternum light yellow. Hypopygium (see fig. 1 and 2, plate X). Pleurites short and broad, the caudal end produced into one fleshy and three chitinized appendages, as follows: Viewed from above, a fleshy lobe in front, the inner dorsal margin produced entad and dorsad into a slightly curved slender spine; behind the fleshy lobe arises a stout hook, very strong at the base, constricted before the middle, the tip slender and pointed, this hook directed entad and caudad; from the outer ventral angle of the pleurite arises a long, straight chitinized appendage, directed entad and caudad, narrow basally and more enlarged apically. The guard of the penis is long, pale, ending in a long, slender, tube-like point. On either side of the penis guard arises an elongate, very slender, chitinized hook, which is straight for about three-fifths its length and then bent strongly inward; viewed from the side, these hoops are bent very strongly ventrad and then caudad. Summarized, the hypopygium bears eight chitinized slender arms, all except two (which are probably homologous with the second gonapophyses) being borne by the pleurites.

Female.—Very similar to the male, but larger.

Vial No. 1.—Tokio, Japan; Aug. 1912. One ♂.

Vial No. 5.—Nishigahara, Japan; Apr. 25, 1912; 5 ♂, 4 ♀.

Holotype, ♂; Vial No. 1.

Allotype, ♀; Vial No. 5.

Paratypes, 5 ♂, 3 ♀; Vial No. 5.

Types in author's collection; Paratypes in U.S. National Museum and Cornell University Collections.

G. superba differs from *nubeculosa* Meij. (Java). (Tijd. voor Entomol., vol. 44, p. 48, 49; fig. 36, 1911) in the unspotted wings; from *metatarsata*, (l.c., p. 48, fig. 35) in its closed cell 1st M₂, etc.

Gonomyia (Leiponeura) insulensis, sp. n.

Pleurae without longitudinal stripes; vein Sc ends far before the origin of Rs.

Female.—Length, 3.9–4 mm.; abdomen, 2.6 mm.; wing, 4 mm.

Female.—Rostrum yellow, palpi brown; antennae, segment one yellowish, remainder dark brown; front, vertex and occiput yellow, the vertex suffused with dark colored.

Mesonotal præscutum yellowish, with three brown stripes, the median one broad, not divided by a pale median vitta, extending to the suture, the lateral stripes are broad, narrow, uniform in width until they cross the suture (not expanded behind), lateral margin of the sclerite dull yellow, the ground color between the brown stripes is very reduced; scutum, lobes dark brown, median line yellowish; scutellum yellow, a brown median spot in front; postnotum brown. Pleuræ, mesopleuræ brown in front, extending from the lateral margin of the præscutum down to and suffusing the mesosternum on the sides; metasternum pale brown. Halteres dull yellow. Legs: coxæ and trochanters yellow, suffused with brown in front; femora, tibiæ and tarsi brown, a little darker toward the tip. Wings subhyaline, veins brown. Venation (see fig. 12, plate III); Sc. ending far before the origin of Rs; R^{2+3} almost parallel to R^1 .

Abdominal tergites yellowish-brown; sternites light yellow.

Vial No. F.—Tokio, Japan; August, 1912; 1 ♀.

Holotype, ♀; in Vial F.

Type in author's collection.

The three species of *Gonomyia* described by de Meijere as *Atarbæ* (Tijd. voor Entomol.; vol. 44, 1911) are all members of the subgenus *Leiponeura* Skuse. These species are *Gonomyia nebulosa* (l.c., p. 42, fig. 25); *pilifera* (l.c.; p. 43, fig. 26) and *diffusa* (l.c.; p. 43, 44). They have nothing in common with *Atarba* and are quite distinct from any members of the *Leiponeura* group, that I know of, in their clouded wings. *G. insulensis* differs from all of the above species in its unmarked wings.

Genus *Erioptera* Meigen.,

Subgenus *Acyphona* Osten-Sacken.

Of this subgenus, two species were included, both of which are herein characterized as new. The only described Palæarctic species, *Acyphona maculata* Meigen, of Europe, differs from the Japanese species, as follows: Wing pattern, in *maculata* large, rounded brown markings mostly with grey centers; the body-shade is much lighter in *maculata* and there are several important differences in hypopygial characters, these being shown by the following key:

1. 9th tergite broad and thin, at its apex deeply notched; two chitinized teeth at the base of the pleura on the ventral side.....2.
- 9th tergite provided with two chitinized hooks at its apex; no chitinized teeth at the base of the pleura on the ventral side; [horns of the second gonapophyses long, widely separated at the base] (Japan).....*asymmetrica*, sp. n.
2. Base of pleura on sternal side provided with a chitinized plate which is bidentate, the proximal tooth free, the distal one joined to the pleura; 2nd gonapophyses short, chitinized at tip and on sides; apex merely notched.
(Europe).....*maculata* Meigen.
- Base of pleura on sternal side provided with a small chitinized tooth, minutely denticulate; 2nd gonapophyses long, the tips long and widely separated (Japan).....*incongruens*, sp. n.

Erioptera (Acyphona) incongruens, sp. n.

Small species; light brown, with narrow dark brown pleural stripes; wings thickly spotted with brown.

Male.—Length, 5 mm.

Male.—Rostrum and palpi brown. Antennæ long, segment one brownish-yellow; segments two to eight light yellow; remainder with increasing amounts of brown at their tips, the apical segments all brownish. Front, vertex and occiput dark brown.

Thoracic pronotum brownish-yellow, brown on the sides. Præscutum reddish-brown, with a double median brown stripe; humeral region brighter yellow; sides of the sclerite darkened; scutum, scutellum and postnotum brown. Pleuræ reddish-brown with narrow dark-brown lines, the most dorsal one continuing from behind the fore coxa underneath the wing to the postnotum; the second beginning on the mesosternum running above the middle coxa, becoming very narrow and indistinct before the root of the halter; the last stripe on the metasternum over the hind coxa. Halteres light yellow. Legs: coxa brown; trochanters brownish-yellow. (The legs are all detached and loose in the vials; most of these have the femora largely brown, basal third mostly paler, yellowish; a post median yellow ring, tip usually pale; tibiæ and

tarsi clear light yellow, sometimes infuscated at the tips; tibiae often with a sub-basal annulus. In the vial were several specimens of *E. asymmetrica*, a closely allied form, and most of the legs evidently belong to that species. Two legs in the vial are very different and may belong to this little species, this being rendered probable by the size; in these the entire legs are clear, light yellow, the femora with a rather narrow subapical dark brown ring).

Wings spotted with brown.

Abdomen: Tergum dull brownish yellow, apex and lateral margins of the sclerites brown. Hypopygium unsymmetrical as in the genus, the 9th abdominal segment being twisted one-half around. Suture between the 9th tergite and the 9th sternite not indicated. The 9th tergite is broad and long, its hind margin produced caudad in a wide, thin plate which is broadly and rather deeply notched at its middle; no chitinized hooks at its apex. The pleurites are convex outerly (produced into two apical appendages), the base (dorsal) produced entad and cephalad in a long, chitinized hook; the ventral edge of the pleura near the sternum possesses a small chitinized organ which is directed caudad and is provided with two or three denticulae; of the two apical appendages, the ventral one is chitinized, the dorsal one is fleshy, the second gonapophyses are close together, the chitinized tips rather long and deeply divided. (See plate X, figs. 5 and 6).

Holotype, ♂. Vial 6, April 25, 1912; Tokio, Japan.

Erioptera (Acyphona) asymmetrica, sp. n.

Resembles *incongruens* closely, but is larger, the coloration darker, especially on the pleurae and usually on the abdomen. Wings hyaline, spotted with brown, varying considerably in the intensity and size of the markings; in some the dots are small, not confluent, in the darker specimens the spots on the costal half of the wing tend to flow together to form large blotches. The male genitalia of the two species is remarkably different. (See plate III, fig. 15, wing.)

The hypopygium is, as in the genus, asymmetrical, the usual dorsal portions of the 9th sclerites being switched around on a level with the pleural sutures of the remaining segments. (See fig. 7-9, plate X), suture between 9th tergite and sternite obliterated, 9th

tergite broad and long with a cross-shaped mark; near its tip set with two small, semicircular, chitinized pieces which are produced into sharp points on the proximal ends. Pleurites short and stout, at the base on the dorsal side, produced into a long, slender, chitinized arm which is directed entad, two apical appendages, the more ventrad being chitinized, especially at the tips, the dorsal apical appendage fleshy. Between the tergite and the unarmed sternite, nearly in the median plate, is a rectangular, subchitinized organ, bearing at its outer angles chitinized hooks, bent ventrad and inward, these hooks minutely denticulated at tip.

♂.—Length, 5.8 mm.; wing, 6.3 mm.

♀.—Length, 6.4–7.1 mm.

Holotype.—Vial 6, April 25, 1912; Tokio, Japan.

Allotype.—Vial 6, April 25, 1912; Tokio, Japan.

Paratypes.—Vial 6 and L; 4 ♀, 2 ♂, April 25, 1912; Aug. 1912, Tokio, Japan.

Subgenus Erioptera, Meigen.

Erioptera (Erioptera) elegantula, sp. n.

Wings with brown spots.

Male.—Length, 5.4 mm.; wing, 7.7–7.9 mm.

Female.—Length, 6–6.5 mm.; wing, 7–8.3 mm.

Male.—Rostrum and palpi dark brown, antennæ with basal segments brown, flagellar segments short, dark brown; front, vertex and occiput dark brown.

Pronotum dark brown above, lighter colored on the sides. Mesonotum dark brown, the region before the pseudosutural pits more yellowish; scutum, scutellum and postnotum dark brown. Pleuræ dark brown. Halteres pale. Legs: coxæ dark brown; trochanters brown; femora dark brown; tibiæ dark brown, a little paler at the extreme base; tarsi dark brown. Wings subhyaline with greyish-brown marks, as follows: A large rounded spot at origin of Rs, a second at Sc², a third at end of Sc¹ running down over cross-vein r; a fourth spot at tip of R¹ and a smaller one at tip of R²; cord broadly margined with the same color; less distinct clouds at ends of the other veins and along most of these veins. Venation, (see fig. 3, plate III.)

Abdomen dark brown, densely clothed with long whitish hairs. Hypopygium. 9th tergite broad at base, narrowed at the middle,

the tip rather expanded with a deep V-shaped incision, the lobes rounded. Pleurites long, cylindrical, not very convex on outer face; three apical appendages, the more dorsal being somewhat fleshy, brown, elongate-cylindrical, narrowed basally, provided with long hairs, and, at its tip, with a slender hook directed cephalad; the median apical appendage is longest, chitinized, very strongly so at its tip; tip broadly expanded and concave, this concavity provided with minute denticulæ; the ventral apical appendage is shorter than the median one, fleshy, cylindrical, narrowed at base. Viewed from beneath, the 9th sternite is straight on its caudal margin, pleurites very broad at base, produced entad and almost meeting on the median line on the sternum; second gonapophyses long, slender, acicular, the tips barely projecting beyond the caudal level of the 9th sternite.

Female.—Similar, but averages larger in size.

Vial No. 1.—Tokio, Japan; 2 ♂, 2 ♀.

Vial No. 16.—Tokio, Japan; 2 ♀ (small, but apparently of the same species.)

Holotype.—♂. Vial No. 1, I.

Allotype.—♀. Vial No. I.

Paratypes.—1 ♂, 3 ♀, Vials I and 16.

Types in author's collection.

E. elegantula differs from *E. javensis* Meij. (Tijd voor Entomol., vol. 44, p. 45, 46, fig. 28, 1911) and *E. notata* Meij. (l.c., p. 46, figs. 29–31) in its spotted wings.

Genus Molophilus Curtis.

Molophilus pegasus, sp. n.

Antennæ of the male short; color of body brown.

Male.—Length, 4.2 mm.; wing, 4.3 mm.

Female.—Length, 4.9 mm.; wing, 5.1 mm.

Male.—Rostrum and palpi dark brown; antennæ light yellow, the flagellar segments with the exception of the first, a little more brownish; antennæ short, extending about to the base of the wings, segments of flagellum cylindrical; front, vertex and occiput brown.

Pronotum above, light yellow, darker on the sides. Mesonotal præscutum reddish-brown, with a broad, dark brown median stripe, and less distinct but broader lateral stripes, which begin

behind the pseudosuture, broaden out behind and fuse with the median stripe near the transverse suture; scutum, lobes brown, median line paler; scutellum lighter colored, yellowish medially, brown on the sides; postnotum brown. Pleurae brown except dorsally, where there is a pale band running from the pronotum back to the wing basis. Halteres light yellow. Legs: coxae and trochanters pale yellow, femora short, incrassated beyond the base, brown, paler basally; tibiae and tarsi brown. Wings slightly tinged with yellowish-grey; veins yellow. Venation (see fig. 11, plate III).

Abdomen, tergites dark brown; sternites rather lighter brown, extreme apices of the sclerites pale. Hypopygium (see figs. 3 and 4, plate X); 9th tergite and sternite completely fused so that no pleural suture remains; viewed from beneath, the 9th sternite projects backward, its caudal margin rather squarely truncated; the outer ventral pleural arm is straight, fleshy, rather thickly covered with long hairs; just entad of the outer arm and nearer to the base of the pleurite, arises the inner ventral pleural arm, which is elongate, slender, its tip strongly chitinized and denticulated at the extreme end and bent inward; the guard of the penis is a pointed, chitinized organ, nearly as long as the outer pleural arm. Viewed from the side, outer ventral arm of the pleurite directed caudad; inner ventral arm with the tips conspicuously arcuated and bent ventrad; just above the base of the inner arm arises the dorsal pleural appendage, very broad at the base, its tip chitinized and directed slightly dorsad, on the dorsum of the pleurite are two protuberances clothed with long hairs. Viewed from above, the pleurites are very broad, so that the space between them on the median line is narrow; about midway of their length, on the inner face, is a strong protuberance, directed inward; it is strongly chitinized and almost touches its mate of the opposite side.

Female.—Similar, but larger; the abdomen is dark brown, the genital segment much brighter, yellowish-brown.

Vial No. 19.—Tokio, Japan; June 25, 1912; 1 ♀.

Vial No. 20.—Tokio, Japan; June 25, 1912; 1 ♀.

Vial No. K.—Tokio, Japan; Aug. 1912; 1 ♂.

Holotype.—1 ♂, Vial K.

Allotype.—1 ♀, Vial 20.

Paratype.—1 ♀ Vial 19.

Types in author's collection; paratype in U.S. National Museum collection.

M. pegasus differs from *bicolor* Meij. (Java) (Tijd. voor Entomol.; vol. 44, p. 45, fig. 27) in its darker brown body-color and darker legs.

Genus Conosia Van der Wulp.

Conosia irrorata Wiedmann.

The following papers since Kertész (1902) may be cited:

1904.—*Conosia irrorata* de Meij; Bijdragen tot de Dierkunde; p. 92.

1911.—*Conosia irrorata* de Meij; Tijdschrift voor Entomologie; vol. 44, p. 51.

1911.—*Conosia irrorata* Brun.; Rec. Indian Museum; vol. 6, part. 5, p. 283.

1912.—*Conosia irrorata* Brun.; Fauna Brit. India, Dipt. Nemat., p. 497.

One female in vial 47; Tokio, Japan. The wing pattern is figured on pl. III; fig. 13.

EXPLANATION OF PLATE X.

Fig. 1.—Hypopygium of *gonomyia superba*; dorsal aspect; x, y, z = chitinized pleural appendages.

Fig. 2.—Hypopygium of *gonomyia superba*; lateral aspect, sternum uppermost; lettering as in fig. 1.

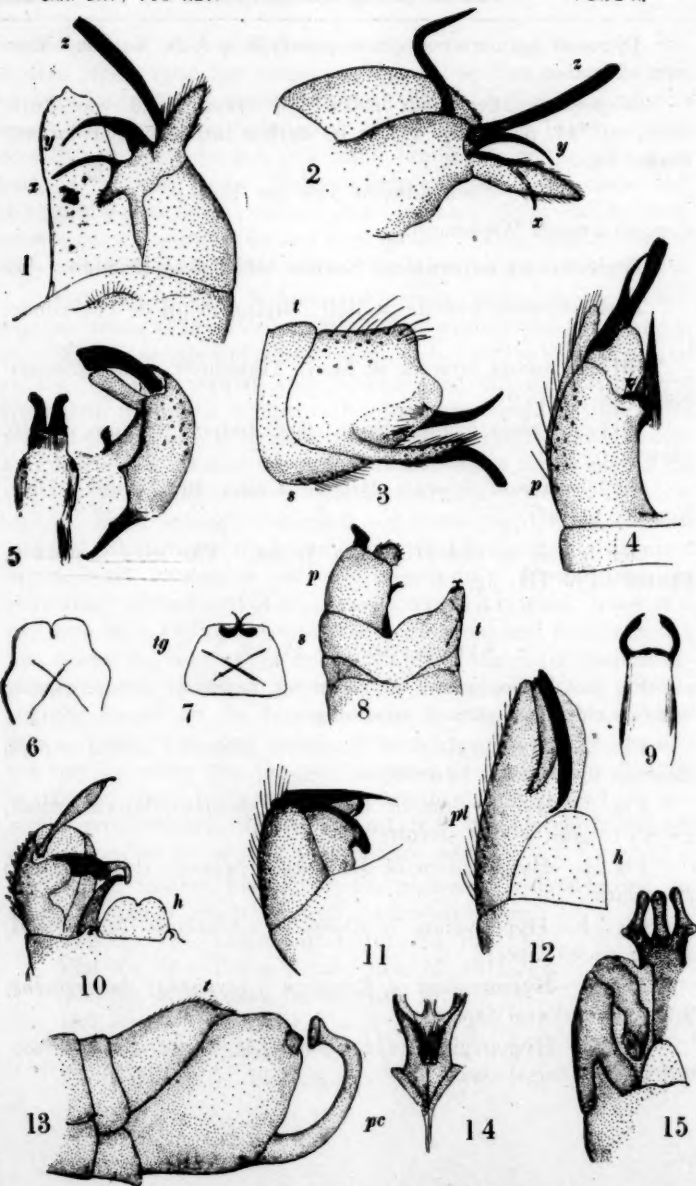
Fig. 3.—Hypopygium of *Molophilus pegasus*; lateral aspect; t = 9th tergite; s = 9th sternite.

Fig. 4.—Hypopygium of *Molophilus pegasus*; dorsal aspect; p = pleura.

Fig. 5.—Hypopygium of *Erioptera (Acyphona) incongruens*, sp. n.; dorsal aspect.

Fig. 6.—Hypopygium of *Erioptera (Acyphona) incongruens*; 9th tergite, dorsal aspect.

Fig. 7.—Hypopygium of *Erioptera (Acyphona) asymmetrica*; 9th tergite, dorsal aspect.



JAPANESE CRANE-FLIES (ALEXANDER)

EXPLANATION OF PLATE X.—Continued.

Fig. 8.—Hypopygium of *Erioptera (Acyphona) asymmetrica*; lateral aspect; p = pleura; s = 9th sternite; t = 9th tergite.

Fig. 9.—Hypopygium of *Erioptera (Acyphona) asymmetrica*; dorsal aspect; gonapophyse.

Fig. 10.—Hypopygium of *Limnophila japonica*; dorsal aspect; h = anal tube.

Fig. 11.—Hypopygium of *Limnophila satsuma*; ventral aspect.

Fig. 12.—Hypopygium of *Limnophila inconcussa*; dorsal aspect; h = anal tube; pl = pleura.

Fig. 13.—Hypopygium of *Liogma kuwanai*; lateral aspect; t = 9th tergite; pc = penis-guard.

Fig. 14.—Hypopygium of *Liogma kuwanai*; ventral aspect of the base of the tripartite penis-guard.

Fig. 15.—Hypopygium of *Liogma kuwanai*; dorsal aspect.

(TO BE CONTINUED.)

A NEW PYROMORPHID FROM TEXAS.

BY WM. BARNES, M.D., AND J. McDUNNOUGH, PH.D., DECATUR, ILL.

Acoloithus novaricus, sp. nov.

Very similar to *falsarius* Clem., having the wings of the same dull black colour. The distinguishing feature is that the collar is unbroken reddish-orange, whereas in *falsarius* this colour is confined to the lateral areas, the centro-dorsal portion being black. Expanse, 14 mm.

Habitat: Kerrville, Texas; Shovel, Mt. Texas (July), 2 ♂'s. Type and cotype coll. Barnes. 4 ♂'s (Texas). Cotypes, Tring Museum, England.

Dr. K. Jordan, with whom we have recently had some correspondence concerning this group, has called our attention to this species and expressed the desire that we describe it. We take pleasure in doing so, as the characteristic feature seems very constant.

September, 1913

FURTHER NOTES ON ALBERTA LEPIDOPTERA.

BY F. H. WOLLEY DOD, MIDNAFORE, ALTA.

(Continued from page 244.)

423. *S. athabasca* Neum.—The only locality given for this species in Smith's Catalogue is "British Columbia," presumably on the strength of the description, which I have not seen. But I have seen the type, a male, in the Neumogen collection, and it is labelled "Belly River," which is in Southern Alberta, and no portion of it in B.C. I have seen the species fairly swarming around Gleichen, and on the Blackfoot Indian Reserve near there. It is almost or quite exclusively a day flier, and revels in hot sunshine, usually accompanied, in far fewer numbers, by *Melicliptera septentrionalis* and *Melaporphyria oregonica*. The Laggan specimens I referred to as having orange secondaries are *petricola* Walker, described from Rocky Mountain specimens taken by Lord Derby's collectors. A prairie and a mountain series of these respectively might easily give every impression of two species, especially if the series were short ones. Mountain specimens are usually a trifle more robust and larger, have yellowish or orange secondaries and ochreous tinted primaries, the depth of this tint varying as the depth of color of the secondaries. In size, my prairie specimens vary from about 28 to 31 mm., smaller specimens being uncommon. Mountain specimens seen to average scarcely more than 1 mm. larger, but my largest specimen, a handsome female from Field, B.C., expands very nearly 35 mm. My darkest and most richly coloured example is from Windermere, also in B.C. But an orange-tinted form is rare on the prairie, and a form with creamy white ground is equally rare in the mountains. Each of these grades through to the predominating form in their respective districts, and the extremes in each overlap those in the other. I regret to say that my entire series of these at present consists only of twenty-five specimens, but I have examined a good many more, both dried and in nature, and after years of deliberation have come to the conclusion that the balance of evidence is strongly in favor of there being only one species.

Petricola may stand for the form with orange secondaries. Walker's type happens to be paler than average mountain specimens. The names of course should be reversed, thus:

S. petricola Walk.—Ground color of primaries creamy ochreous, secondaries orange. Alberta Rocky Mountains. Rare on the prairie.

Var. *athabasca* Neum.—Ground color of all wings whitish, sometimes pure white. Alberta prairies. Rare in the mountains.

It usually flies on the prairies from the middle of June to the middle of July. My mountain specimens are dated from June 30th to July 27th, but I don't know that I was ever in the mountains before the earlier date. It flies most freely at low levels, but my palest mountain specimen comes from 7,500 feet on Mt. Saskatchewan, and was taken by Mrs. Nicholl. I have a female from Eureka, Utah, which is probably *petricola*. *Athabasca* is well figured by Holland on Pl. XXX., f. 29. What his fig. 35 is I don't know. It may possibly be a worn specimen of this species, but shows more reddish in the secondaries than any of mine. It certainly is not *alleni*. Grote's type of *alleni* in the British Museum appeared to me to be *adumbrata*, as did also the *alleni* of the Henry Edwards collection.

An analogous case to this amongst Alberta butterflies is perhaps found in *Argynnis electra*, which is the predominating form in the mountains where *lais* is rare; whereas *lais* is the normal prairie form, where *electra* is seldom met with.

424. *S. sp.*—I had listed this as *hudsonica*, and it is the *hudsonica* of the Kootenai List. I do not feel quite confident that it is not a variation of that species (No. 422), but I have so far been unable to connect them. I have never taken it on the prairie, nor nearer to Calgary than Laggan, but have seen it on the wing in the daytime in abundance all through the mountains during July, and Dr. Dyar records it apparently as somewhat common in the Kootenai from May 29th to July 13th. So far as the males are concerned, the maculation and color scheme is practically identical with *hudsonica*, but the tone is very much darker, there being more inoration with black scales, and all the black shades blacker.

Both species have usually a fuscous transverse bar or shade through the outer portion of the median pale band on the primaries in both sexes. This is normally very distinct, and I have no specimens in which it is not at least traceable. In the males only of both, this bar or shade is sometimes chestnut brown, and when best developed this is very conspicuous, as it is the only portion of the fore wing, and that almost of the palest ground, in which this color appears. In *hudsonica* this takes somewhat the form of a bar with well-defined edges, and may consist of a broadly geminate waved brown line, with the included space paler brown. In No. 424, though often broader, it has ill-defined edges, coalescing gradually with the pale ground.

But the most obvious superficial difference between the forms is seen in the females. Whereas in *hudsonica* this sex has the primaries much greyer and more even, with the maculation partially obsolete or ill-defined, in No. 424 the sexes are alike, with the exception that in neither case is the brown-barred variation found in the females, at least so far as I have yet observed.

In the Kootenai List, Dr. Dyar referred to the brown-barred form as var. *seposita* Hy. Edw., and I found a series of such forms separated under that name in the Washington Museum. I saw a male type of *seposita*, from Colorado, in the Henry Edwards collection. It certainly seemed near this form, and may be the same, though I did not compare a specimen, and do not feel at all convinced of its identity. There is another male type in the Neumögen collection.

The ground color of the secondaries of *hudsonica* is pale creamy white. In No. 424 it is darker, a trifle ochreous, sometimes slightly orange. Holland's Plate XXX., fig. 31, under *hudsonica*, is apparently this form, and I can match it very closely in my collection.

It is quite possible that this is a somewhat similar example of what I believe to be racial variation in *petricola* and *athabasca*, and that *hudsonica* is easily influenced by environment and has developed strongly marked races in localities no great distance apart.

430. *Philometra metonalis* Walk.—The type is a male from St. Martin's Falls, Hudson Bay Territory. It is a very even specimen, and has scarcely any trace of transverse lines. *Gaosalis*

Walk. (not *goasalis*), from Nova Scotia, a male from Lieut. Redman, is better marked. They appeared to me to be the same species, and the one here listed.

THYATIRIDÆ

433. *Pseudothyatira expultrix* Grt.—I have seen a specimen from Edmonton, taken by Mr. F. S. Carr, on June 10th, 1910. The same collector also submitted to me a specimen of *cymatophoroides*, taken on July 17th of the same year, which is now in my collection. These forms appear to me to be distinct species, as the transverse lines differ. In *cymatophoroides* the posterior edge of the transverse anterior bar is much less waved or crenate than in *expultrix*, and the same is true of the t.p. line, which in *expultrix* is generally deeply crenate. This difference is most obvious near the anal angle, where is the dark-brown patch generally so conspicuous in *cymatophoroides*. This patch is sometimes much reduced, whilst in one of my Vancouver specimens of *expultrix* there is a small patch of dark brown after the t.p. line at this point, though the line itself is deeply crenate. The same specimen has no trace of dark brown in the t.a. bar.

In the Kootenai List, Dr. Dyar suggested that these forms might be distinct, as he found a slight, though apparently not constant, difference in the larvæ.

NOTODONTIDÆ.

436. *Melalopha albosigma* Fitch.

437. *M. brucei* Hy. Edw.—I have occasionally taken both these species at light, not uncommonly, at the end of May and early June.

439. *Notodonta simplaria* Graef.—High River (Baird). Also at head of Pine Creek, May 29th, 1910.

440. *Pheosia dimidiata* H.-S.—One at light at head of Pine Creek, June 5th, 1910. High River, May 7th, 1910 (Baird).

441. *Harpyia scolopendrina* Bdv.—I have about twenty local specimens under this name, and have taken more, May 11th to June 5th. Also one from Banff (Sanson), June 25th. I have not been able to verify the name. It is doubtfully the same as the species figured by Holland on Plate XXXIX., Fig. 11., being paler in ground colour, with much more distinct lines in the postmedial area, and

none of my specimens have as wide a band. In all my series the median band is entire.

442. *H. modesta* Huds.—Besides the three previously referred to, I have only taken four more specimens, on June 7th and 17th, 1910. In three out of this series of seven the median band is broken centrally and forms two quite distinct blotches. In a fourth it is so constricted that the margins nearly meet below the median vein. The others are not unlike Holland's *scolopendrina*, referred to above, and have a similar band on secondaries, but the ground colour of my specimens is more ochraceous, the transverse postmedial lines more distinct, and the discal dot on all wings heavier. I query the name, as I find I have made a note to the effect that, "Packard's figure of *borealis* is the '*modesta*' of my Calgary list." If the note and Packard's figure are correct, it remains to be discovered what is the correct name for the species—not in my collection—figured by Holland as *borealis*, and standing as such in the British Museum.

442a. *H. (? var.) albicoma* Strk.—I have thirteen Alberta specimens in my collection, from Red Deer River and head of Pine Creek, collected by myself, and from High River, from Mr. Thomas Baird. May 30th to July 7th. I have the same form from Wellington, Vancouver Island, and it is that figured by Holland under this name. It differs from what I hold as *scolopendrina* in the slightly paler and less smoky ground, in the narrower median band, which is often much constricted and sometimes divided into two blotches, in the greater preponderance of fulvous scales, especially in the band, and in having the discal spot on primaries more usually punctiform than linear. In my former notes, the words, "has no fulvous scales," were a grave error, as were also "the two inner lines of the three beyond the cell are obsolete" (Vol. XXXVIII., p. 52, Feb., 1906). The form is hard to separate from what I hold as *scolopendrina*, and may not improbably prove a variety of that.

443. *Gluphisia septentrionalis* Walk.—High River (Baird). Two females, June 30th and July 7th.

444. *G. lintneri* Grt.—A few more specimens have come to hand, April 19th, 1906, May 26th, 1907, and one in 1911. The first of these was taken flying in sunshine.

LIPARIDÆ.

446. *Notolophus antiqua* Lin.—I have occasionally seen the male of this species on the wing in sunshine during September in some numbers, and have bred it from *Salix*.

447. *Olene vagans* Barnes & McDunnough, var. *grisea* B. & McD. (Contributions, Vol. II., No. 2, pp. 60 to 63, pl. III., April, 1913).—This is the species standing as *Olene plagiata* Walk. in our lists, and was supposed to be the *Acyphas plagiata* of Walker. When at the British Museum early in 1912 I saw Walker's type, and recognized it as the well-known *leucostigma* of Abbott and Smith. This is referred to by Messrs. Barnes & McDunnough on page 50 of their "Contributions" quoted above, and Walker's type is figured on Plate VII., Fig. 1. Those authors considered the present species unnamed, and described it accordingly as *vagans*. They divided it into three sub-species: (a) *vagans*, types from St. Johns and Montreal, Que., and Yaphang, L. I.; (b) *grisea*, types from Eureka and Provo, Utah; (c) *willingi*, types from Humboldt, Sask. I have seven Alberta specimens, six males and a female, from Red Deer River, head of Pine Creek, and High River, the latter from Mr. Eaird, June 17th to July 27th. All of these seem referable to *grisea*. I have the same form from Cartwright, Man., Wellington, V. I., and Eureka, Utah.

GEOMETRIDÆ.

452. *Rachela bruceata*.—The larvæ of this species have again denuded hundreds of acres of *Populus tremuloides* in this district during the present year (1913). The denudation is greater in extent than it was ten years ago, though none has been observed during the intervening period. After starving themselves out on a patch of poplars, they spread to neighboring species of *Salix*.

453. *Tallegeda montanata* Pack.—Red Deer River, July 8th, 1905; Banff, June 28th—July 1st, 1907. The Banff specimens, like a series from Field, B. C., are rather darker than those from the prairie, and have duller secondaries.

486. *Mesoleuca hersiliata* Guen.—I have taken two more specimens, on August 24th, 1907, and July 24th, 1909.

490. *Hydriomena multiferata* Walk.—Lake Louise, Laggan, July 18th, 1907, one specimen.

491. *H. custodiata* Grt.—Three more specimens. Red Deer River, July 21st and 24th, and head of Pine Creek, July 27th, all in 1907.

493. *Cænocalpe magnoliata* Guen.—Two more specimens, at Head of Pine Creek, on July 15th, 1906, and July 16th, 1911; one at Banff, July 1st, and another at Laggan, July 18th, 1907.

495. *C. topazata* Grt.—Head of Pine Creek, May 26th, 1907.

498. *Xanthorhoe abrasaria* H.-S.—One at Head of Pine Creek, July 3rd, 1904.

501. *X. turbata* Hbn., syn. *circumvallaria* Taylor.—I quoted Mr. Prout's MS. reference in a footnote to my previous notes. The same reference is made by Messrs. Barnes & McDunnough in Vol. XLIV., p. 274, Sept., 1912. Taylor described it from Laggan specimens only.

502. *X. fossaria* Taylor—Described from three males and a female from Laggan, Alta., and two males from Mt. Cheam, B. C. One from the latter locality is the type (CAN. ENT., XXXVIII., 401, Dec., 1906).—In March, 1906, I visited Mr. Taylor, and received from him, amongst other species, a series of six Wellington specimens as *fossaria*, bearing dates of June 15th to 30th, 1902 and 1905. They certainly look to me the same species, but it is strange that no mention is made of its occurrence at Wellington in the description.

503. *Synelys enucleata* Grt.—Two more Red Deer River specimens, July 24th, 1907.

519. *Deilinia borealis* Hulst.—I have a female taken by Mrs. Nicholl at Banff on June 24th, 1907.

(To be continued.)

ODOUR PREFERENCES OF INSECTS.

BY HARRY B. WEISS, NEW BRUNSWICK, N.J.

Moths, butterflies, bees, flies and other insects feed upon the nectar of flowers, being guided to them presumably by the senses of smell and sight. Various investigators have differed in this, Lubbock claiming that bees, for instance, recognize at a distance and prefer certain colours; while Plateau found that neither form

nor colour played any part in attracting insects and that they were guided entirely by a sense of smell.

This sense is defined by Forel as "a special sense which allows the animal to recognize at a distance by some specialized energy the (chemical) nature of a certain body." Our scientific knowledge of odours is rather meagre. Some are known vaguely as pleasant or unpleasant and for many we have no definite names whatever, and are forced to liken them to the few odours with which we are familiar and for which we have definite names. Moreover, some smells are exceedingly complex experiences involving elements of taste, touch and vision. The most satisfactory classification of smells is that adapted by Zwaardemaker from the classification of Linnæus, which groups natural objects according to similarities, but does not aim to itemize all smells. This list is as follows:

- 1.—Ethereal smells, including all fruit odours.
- 2.—Aromatic smells; for example, those of camphor, spices, lemon, rose.
- 3.—Fragrant smells, those of most flowers.
- 4.—Ambrosiac smells—all musk odours.
- 5.—Alliacous smells—those of garlic, asafoetida, fish, chlorine.
- 6.—Empyreumatic smells—those of tobacco, toast.
- 7.—Hircine smells—those of cheese, rancid fat.
- 8.—Virulent smells—those of opium.
- 9.—Nauseating smells—those of decaying animal matter.

In the Lepidoptera practically all members are attracted by fragrant smells. The Coleoptera have a somewhat wider range. Dermestidæ are attracted by fragrant and also hircine odours; *Dermestes lardarius*, for instance, the larva of which feeds on bacon, cheese, meat and feathers. The bumble flower beetle, *Euphoria inda*, finds ethereal and fragrant odours to its liking, being found feeding on peaches, grapes, apples and the pollen of flowers. Locust borers and soldier beetles are plentiful on goldenrod and various Buprestids also visit flowers, while the cigarette beetle has an empyreumatic taste. The Silphidæ, however, are drawn to nauseating odours, feeding, as they do, on decaying flesh.

With the exception of the ants, nearly all Hymenoptera are attracted by fragrant odours and also ethereal odours, the Vespidæ and bees being very fond of nectar and fruit juices. Ants have a

wider range, ethereal, alliaceous, hircine and nauseating odours all being more or less attractive.

The range of the Diptera is exceptionally wide, embracing ethereal, fragrant, alliaceous, hircine and nauseating odours. Certain species of mosquitoes, bee flies, and syrphus flies are found feeding on nectar. *Eristalis tenax* visits cesspools, dung-pits and decaying vegetable matter in addition to different flowers. Drosophilidae visit decaying fruits both for food and egg deposition, and *Piophilha casei* is drawn toward cheese, ham and partly spoiled vegetable matter; while the house fly, as everyone knows, shuns nothing except aromatic and virulent odours.

Robertson's records show clearly that the Hymenoptera and Diptera are especially fond of fragrant odours. He found that *Pastinaca sativa* was visited in twenty-six days by 173 Hymenoptera, 72 Diptera, 14 Coleoptera, 9 Lepidoptera, 6 Hemiptera and 1 Neuropteran; also that *Asclepias verticillata* was visited by 52 Hymenoptera, 42 Diptera, 16 Lepidoptera and 3 Coleoptera.

It would be extremely interesting to find the effect of exhaustion upon the end organs of smell. A bee, for instance, visiting innumerable flowers of the honeysuckle must have its organ fatigued by the continuous smelling of this one odor. How, then, would it react to other odours? Does its physiological mechanism of smell consist of distinct parts, one of which might be put temporarily out of commission without impairing the others, or does it consist entirely of one part?

THREE NEW GALL MIDGES (DIPTERA).

BY E. P. FELT, ALBANY, N.Y.

The following descriptions are of species which have been reared and of one concerning which we possess some exceptionally interesting data. There is much to be learned about our tropical or subtropical midge fauna. There must be hundreds of interesting and undescribed species existing in the West Indies and adjacent countries.

Karschomyia cocci, n. sp.

The midges described below were reared from a sugar-cane mealy bug, *Pseudococcus sacchari* (?) collected at Central Providencia, Patillas, P.R., January 30, 1913, by Mr. D. L. Van Dine.

September, 1913

The type species of this genus, *K. viburni* Felt is easily distinguished by the almost trinodose character of the flagellate antennal segments of the male; while the only other known species, the Peruvian *K. townsendi* Felt, has much more slender flagellate antennal segments in the male, the stems in this latter each having a length $3\frac{1}{2}$ times their diameter. Described from specimen in alcohol.

Male.—Length, 1 mm. Antennæ, $\frac{1}{4}$ longer than the body, rather thickly haired, yellowish brown; 14 segments, the fifth having the stems with a length $1\frac{1}{2}$ and two times their diameters, respectively; circumfili and setæ well developed. Palpi: First segment short, subquadrate; the second with a length three times its diameter, the third $\frac{1}{2}$ longer, more slender; the fourth $\frac{1}{2}$ longer than the third. Mesonotum dark brown, the submedian lines fuscous yellowish. Scutellum and postscutellum yellowish. Abdomen yellowish white, the dorsal sclerites and genitalia somewhat fuscous. Halteres pale yellowish. Coxæ and femora mostly pale yellowish; tibiæ and tarsi fuscous yellowish. Claws slender, strongly curved, the anterior unidentate, the pulvilli rudimentary. Genitalia: basal clasp segment moderately stout, the posterior external angles somewhat produced and bearing a group of three or four stout setæ; terminal clasp segment subapical, swollen near the middle, curved; dorsal plate long, deeply and narrowly emarginate, the lobes broad, narrowly rounded.

Female.—Length, 1.5 mm. Antennæ extending to the third abdominal segment, sparsely haired, dark brown; 14 segments, the fifth with a stem about $\frac{1}{4}$ the length of the cylindric basal enlargement, which latter has a length about twice its diameter; terminal segment produced, the enlargement with a length three times its diameter and apically a broad, knoblike appendage. Mesonotum dark brown, submedian lines indistinct. Scutellum and postscutellum yellowish. Abdomen yellowish orange, the dorsal sclerites somewhat fuscous. Ovipositor short, yellowish, the terminal lobes narrowly oval. Halteres: Coxæ and femora mostly pale yellowish; tibiæ and tarsi light straw. Type, Cecid a2415.

Mycodiplois insularis, n. sp.

This midge was reared from a vial containing leaves of *Leonotis nepetæfolia* abundantly infested with red spider. There

were also small, white cocoons among the colonies of red spider collected at Pio Piedras, P.R., August 6, 1913, by Thomas H. Jones. This species appears to be allied to *M. reducta* Felt, from which it is most easily separated by its larger size and the somewhat longer distal stem of the 5th antennal segment. Described from specimens in alcohol.

Larva.—Length, 1.3 mm.; moderately stout, pale yellowish. Head apparently with a length nearly twice its diameter, broadly rounded anteriorly. Antennæ long, with a length fully 10 times the diameter, slender, curving, posterior extremity subtruncate and irregularly papillate.

Male.—Length, 1 mm. Antennæ, $\frac{1}{4}$ longer than the body, sparsely haired, light brown; 14 segments, the 5th having the stems with a length $1\frac{1}{2}$ and $2\frac{1}{2}$ times their diameters, respectively; circumfili well developed. Palpi: the first segment short, subquadrate, the second with a length twice its diameter, the third a little longer, more slender, the fourth $\frac{1}{2}$ longer than the third. Mesonotum dark reddish brown, the narrow submedian lines yellowish. Scutellum and postscutellum pale yellowish. Abdomen mostly pale yellowish, the dorsal sclerites slightly fuscous. Halteres, coxæ and femora mostly pale yellowish, tibiae and tarsi light straw. Claws slender, strongly curved, the pulvilli as long as the claws. Genitalia: basal clasp segment moderately stout, terminal clasp segment swollen basally, slightly curved; dorsal plate moderately long, deeply and roundly emarginate, the lobes narrowly rounded.

Female.—Length, 1.25 mm. Antennæ extending to the second abdominal segment, sparsely haired, light brown; 14 segments, the fifth with a stem $\frac{1}{4}$ the length of the cylindric basal enlargement, which latter has a length $2\frac{1}{2}$ times its diameter; terminal segment slightly produced, with a length three times its diameter, broadly rounded apically. Face yellowish brown. Ovipositor short, yellowish, the lobes narrowly oval. Type, Cecid a2413.

Clinodiplosis examinis, n. sp.

The midges described below were present by hundreds, if not thousands, upon a screen door, or hanging from cobwebs attached thereto at Nassau, N.Y., June 19, 1913. The insects were so

numerous as to fairly dot the surface of the screen here and there, and where spider webs occurred it was not uncommon to see 5 or 6 in a line usually about a quarter of an inch apart. They hung lightly from the web, were easily disturbed and frequently returned to their fragile supports.* The insects were so numerous that it was comparatively easy to capture some 50 with an ordinary collecting bottle by simply placing it over groups of three or four here and there on the screen. The midges had not been observed previously and presumably represent the emergence of a brood from some nearby food plant or food material, possibly plant lice inhabiting adjacent maple or elm trees.

Male.—Length, 1 mm. Antennæ fully $\frac{1}{2}$ longer than the body, thickly haired, light brown; 14 segments, the fifth having the two portions of the stems 3 and $3\frac{1}{2}$ times their diameters, respectively; the distal enlargement with a length $\frac{3}{4}$ greater than its diameter and a slight constriction near the basal third. Palpi: first segment subquadrate, with a length fully twice its diameter; the second a little longer, more slender; the third nearly twice the length of the second, somewhat dilated; the fourth a little longer than the third, more slender. Mesonotum yellowish brown. Scutellum brownish yellow, post scutellum fuscous yellowish. Abdomen mostly reddish brown, the genitalia reddish yellow. Costa fuscous straw. Halteres mostly yellow transparent, slightly fuscous subapically; Coxæ and femora mostly pale yellowish, the tibiæ and tarsi fuscous straw; claws slender, strongly curved, the anterior unidentate, the pulvilli about half the length of the claws. Genitalia: basal clasp segment moderately stout; terminal clasp segment long, slightly swollen basally; dorsal plate short, broad, deeply and triangularly emarginate, the lobes broadly rounded; ventral plate long, rather broad, broadly and roundly emarginate, the lobes short and with a few coarse setæ apically; style long, stout, tapering.

Female: Length, 1.5 mm. Antennæ nearly as long as the body, sparsely haired, reddish brown; 14 segments, the fifth with

*Mr. Frederick Knab (N.Y. Ent. Soc. Journ. 20: 143—46) records a number of Diptera as habitually occurring on spider's webs. In this connection it is worthy of note that Mr. D. B. Young found last June at Albany N. Y. a Tipulid hanging on cobwebs, leaving and returning thereto at will. The species appears identical with a specimen in the state collection determined by Mr. C. P. Alexander as *Oropega obscura*.

a stem nearly $\frac{3}{4}$ the length of the cylindric basal enlargement, which latter has a length about twice its diameter; terminal segment produced, the basal enlargement cylindric, with a length more than three times its diameter and apically a finger-like process. Palpi: first segment subquadrate, with a length more than twice its diameter, the second twice the length of the first, the third a little longer, somewhat dilated; the fourth a little longer and more slender than the third. Mesosotum slaty brown, the submedian lines indistinct. Scutellum yellowish, postscutellum fuscous yellowish. Abdomen brownish red, the dorsal sclerites somewhat fuscous. Ovipositor reddish yellow. Halteres yellowish transparent, fuscous subapically. Coxæ pale yellowish, femora light straw, tibiæ and tarsi fuscous straw. Ovipositor stout, nearly as long as the abdomen, the terminal lobes lanceolate, sparsely setose. Type, Cecid a2411.

Described from a number of males and females taken together and presumably specifically identical.

A NEW SPECIES OF HELIOTHIRIPS (THYSANOPTERA) FROM MARYLAND AND ILLINOIS.

BY J. DOUGLAS HOOD,

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The systematist's interest in the genus *Heliothrips* Haliday is enhanced by the fact that it includes several of the best known and most troublesome species of the order. *Hamorrhoidalis* and *femoralis* are cosmopolitan greenhouse pests; *rubrocinctus*, a widely distributed tropical species, injurious to cacao, has lately appeared in Florida as an enemy of the mango and avocado; *fasciatus* often proves troublesome to beans and other crops in California; while the recently described *phaseoli* is an important bean pest in southernmost Texas.

In a recent paper on the genus,* Dr. Karny unites *Dictyothrips* and *Parthenothrips* with *Heliothrips*, recognizing them as subgenera only, and erects a fourth subgenus, *Selenothrips*, for a new species which he calls *decolor* and for *rubrocinctus* Giard. While admitting that *Selenothrips* is a well-founded subgenus, I can not follow Dr. Karny in his treatment of *Dictyothrips* and *Parthenothrips*. In the

*Revision der Gattung *Heliothrips* Haliday, Ent. Rundsch., 28 Jhg., no. 23, pp. 179-182, 5 figs.; 1911.

September, 1913

sinking of the former, Dr. Karny was led into error by Dr. Hinds' description of *Heliothrips fasciatus* Pergande,** in which the number of segments in the maxillary palpi is erroneously given as three, instead of two—a mistake which was copied also by Moulton.*** *Dictyothrips* is thus readily separable by the three-segmented maxillary palpi; while the number of antennal segments and the decidedly anomalous character of the fore wings marks *Parthenothrips*, in my opinion, as one of the most distinct genera of the entire family.

The new species described below is the tenth one of the genus to be recorded from North America; and as the entomological fauna of the tropical and sub-tropical south becomes better known, this number will doubtless be greatly increased.

Heliothrips striatus, sp. nov.—Figs. 11 and 12.

Female.—Length about 1.1 mm. General color, dark blackish brown (nearly black); head and thorax paler than abdomen, the former with a yellow spot each side of the ocelli; legs dark brown, with the femora and tibiae paler at extremities; tarsi pale; abdomen slightly paler at tip.

Head about 1.6 times as wide as long and about equal in length to prothorax; cheeks rounded to eyes, narrowed to base; dorsal

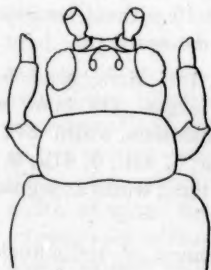


FIG. 11.—Head and prothorax.

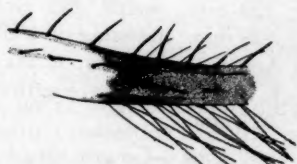


FIG. 12.—Portion of fore wing.

Heliothrips striatus Hood.

surface reticulate, roughened between the lines of reticulation; frontal costa broad, much wider than first antennal segment; vertex

subcarinate in front of ocelli. Eyes less than twice as long as their distance from posterior margin of head, slightly protruding, setose. Ocelli approximate, the posterior pair opposite center of eyes. Antennæ about 2.3 times as long as head; segments 1 and 2 light brown; 3, dark gray, paler in second fifth; 4, dark gray, pale in basal half; 5, pale grayish white, slightly darker apically; 6-8, dark gray. Maxillary palpi two segmented.

Prothorax twice as wide as long, about equal in length to head and with similar reticulation. Pterothorax somewhat broader than prothorax, dark brown in color. Wings long, surpassing the abdomen; fore wing about thirteen times as long as width at middle and with two veins nearly or quite attaining tip; basal vein with four spines, of which the distal is much stouter, black, and situated at the fork (see figure 12); anterior vein usually with one spine (rarely two) at base and two near apex of wing, all black, the basal one unusually stout; posterior vein with five or six equidistant spines at middle, of which three or four are black; fore wings slightly darkened with brown at extreme base, clear white in basal fourth, nearly black in second and third fourths (darkest toward base), clear white again in seventh eighth, and nearly black again in apical eighth, where it is margined with darker.

Abdomen broadly ovate, pointed at tip; *notum of segments 1-8 closely striate laterally*, the striae transverse toward middle of segment and longitudinal at sides. Segment 10 without longitudinal dorsal suture, though irregularly weakened toward tip.

Measurements of holotype: Length, 1.07 mm.; head, length .120 mm., width .192 mm.; prothorax, length .114 mm., width .228 mm.; mesothorax, width .324 mm.; abdomen, width .372 mm. Antennal segments: 1, 21 μ ; 2, 45 μ ; 3, 50 μ ; 4, 45 μ ; 5, 41 μ ; 6, 32 μ ; 7, 15 μ ; 8, 34 μ ; total length of antenna, .28 mm., width at segment 4, .027 mm.

Male.—Length about .84 mm. Sternum of abdominal segments 3-7 each, with a large, pale, transverse area about nine times as wide as long. Segment 9 with two pairs of dorsal spines, of which the basal is much shorter and stouter than the apical.

**Proc. U. S. Nat. Mus., vol. XXXVI, p. 174; 1902.

***Tech. Ser. 21, Bur. Ent., U. S. Dept. Agr., p. 14; 1911.

Measurements of allotype: Length .84 mm.; head, length .102 mm., width .168 mm.; prothorax, length .090 mm., width .196 mm.; mesothorax, width .252 mm.; abdomen, width .228 mm.

Described from three females and one male, taken near Chevy Chase Lake, Maryland, July 6, 1913, by W. L. McAtee, on the under surface of leaves of a tulip tree (*Liriodendron tulipifera* L.); and from one female collected at Parker, Illinois, July 14, 1909, by C. A. Hart, on the same food plant.

Type locality: Chevy Chase Lake, Maryland.

The abdominal sculpture is almost identical with that of *H. phaseoli*, figured by the writer in *Psyche*, Vol. xix, No. 4, plate 8, fig. c, August, 1912. From that species it may be known by the broader head, the much darker color of the body, the details of wing coloration, and the stout black spines on the fore wings at the junction of the two principal veins.

ANOTHER RED SPECIES OF THE GENUS *OLIGOSITA*.

BY J. C. CRAWFORD, WASHINGTON, D. C.

Oligosita giraulti, new species.

Female.—Length about 0.5 mm. Brilliant vermilion, including marginal and stigmal veins of fore wings and marginal vein of hind wings; the femora and hind tibiae red, the red color decreasing apicad on legs and the rest of legs testaceous; submarginal vein with a bristle at middle, and one at apex of vein, near base of marginal vein a short one followed by two longer ones, then one or two shorter ones and a long at apex of vein, fore wings with no discal cilia; marginal cilia at apex of wing slightly longer than width of wing; fumated spot in under stigmal knob distinct; stigmal knob almost circular but with a projection apicad; pedicel about as long as the funicle joint, about as long as middle segment of club which is longer than either the first or third joints; base of abdomen with a whitish band, more or less suffused with reddish and occupying about one-fourth of the abdomen.

Type locality: St. Clair Experiment Station, Trinidad.

The type slide has two specimens reared from the eggs of *Tomaspis varia* by Mr. P. Lachmere-Guppy.

There is also a paratypic slide with one specimen with the record "Reared from grass, Verdant Vale, Jan. 30, 1913, and oviposited in frog hopper eggs" (same date). F. W. Urich, collector.

Type Cat. No. 15971. U. S. N. M.

Easily distinguished by the red color and coloring of the veins; *sanguinea* Girault lacks the red in the veins and *neosanguinea* Girault has a white band occupying about one-third of the abdomen, and the basal joint of the club is at the second.

The species is named in honor of Mr. A. A. Girault who has done most of the work in this family.

Mr. Lachmere-Guppy writes that "this insect in life is vermillion with jet black eyes, and acts like a mymarid".

